

## SECTION 16481 - MOTOR CONTROLLERS

### PART 1 - GENERAL

#### 1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

#### 1.2 SUMMARY

- A. This Section includes ac motor-control devices rated 600 V and less that are supplied as enclosed units.
- B. Related Sections include the following:
  - 1. Division 16 Section "Electrical Identification" for labeling materials.
  - 2. Division 16 Section "Fuses."

#### 1.3 SUBMITTALS

- A. Product Data: For products specified in this Section. Include dimensions, ratings, and data on features and components.
- B. Field Test Reports: Indicate and interpret test results for compliance with performance requirements.
- C. Maintenance Data: For products to include in the maintenance manuals specified in Division 1.
- D. Load-Current and Overload-Relay Heater List: Compile after motors have been installed and arrange to demonstrate that selection of heaters suits actual motor nameplate full-load currents.

- E. Qualification Data for Field Testing Agency: Certificates, signed by Contractor, certifying that agency complies with requirements specified in "Quality Assurance" Article below.

#### 1.4 QUALITY ASSURANCE

- A. Source Limitations: Obtain similar motor-control devices through one source from a single manufacturer.
- B. Comply with NFPA 70.
- C. Listing and Labeling: Provide motor controllers specified in this Section that are listed and labeled.
  - 1. The Terms "Listed" and "Labeled": As defined in the National Electrical Code, Article 100.
  - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" as defined in OSHA Regulation 1910.7.

#### 1.5 COORDINATION

- A. Coordinate features of controllers and accessory devices with pilot devices and control circuits to which they connect.
- B. Coordinate features, accessories, and functions of each motor controller with the ratings and characteristics of the supply circuit, the motor, the required control sequence, and the duty cycle of the motor and load.

### PART 2 - PRODUCTS

#### 2.1 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Allen-Bradley Co.; Industrial Control Group.
2. Eaton Corp.; Westinghouse & Cutler-Hammer Products.
3. General Electric Co.; Electrical Distribution & Control Div.
4. Siemens Energy & Automation, Inc.
5. Square D Co.

## 2.2 MANUAL MOTOR CONTROLLERS

- A. Description: NEMA ICS 2, general purpose, Class A with toggle action and overload element.

## 2.3 MAGNETIC MOTOR CONTROLLERS

- A. Description: NEMA, Class A, full voltage, nonreversing, across the line, unless otherwise indicated. IEC type starters are not acceptable.
- B. Control Circuit: 120 V; obtained from integral control power transformer, unless otherwise indicated. Include a control power transformer with adequate capacity to operate connected pilot, indicating and control devices, plus 100 percent spare capacity.
- C. Combination Controller: Factory-assembled combination controller and disconnect switch with or without overcurrent protection as indicated.
  1. Fusible Disconnecting Means: NEMA KS 1, heavy-duty, fusible switch with rejection-type fuse clips rated for fuses indicated.
  2. Nonfusible Disconnect: NEMA KS 1, heavy-duty, nonfusible switch.
- D. Overload Relay: NEMA ICS 2, Class 10 tripping characteristics selected to protect motor against voltage unbalance and single phasing.

## 2.4 ENCLOSURES

- A. Description: Flush or surface-mounted cabinets as indicated. NEMA 250, Type 1, unless otherwise indicated to meet environmental conditions at installed location.

## 2.5 ACCESSORIES

- A. Devices are factory installed in controller enclosure, unless otherwise indicated.
- B. Push-Button Stations, Pilot Lights, and Selector Switches: NEMA ICS 2, heavy-duty type.
- C. Stop and Lockout Push-Button Station: Momentary-break push-button station with a factory-applied hasp arranged so a padlock can be used to lock push button in depressed position with control circuit open.
- D. Control Relays: Auxiliary and adjustable time-delay relays.
- E. Factory-mounted with Nationally Recognized Testing Laboratory listed and labeled mounting device.

## PART 3 - EXECUTION

### 3.1 INSTALLATION

- A. Install independently mounted motor-control devices according to manufacturer's written instructions.
- B. Location: Locate controllers within sight of motors controlled, unless otherwise indicated.
- C. For control equipment at walls, bolt units to wall or mount on lightweight structural-steel channels bolted to wall. For controllers not at walls, provide freestanding racks conforming to Division 16 Section "Basic Electrical Materials and Methods."
- D. Motor-Controller Fuses: Install indicated fuses in each fusible switch.

### 3.2 IDENTIFICATION

- A. Identify motor-control components and control wiring according to Division 16 Section "Electrical Identification."

### 3.3 CONNECTIONS

- A. Tighten connectors, terminals, bus joints, and mountings. Tighten field-connected connectors and terminals, including screws and bolts, according to manufacturer's published torque-tightening values. Where manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

### 3.4 FIELD QUALITY CONTROL

- A. Testing: After installing motor controllers and after electrical circuitry has been energized, demonstrate product capability and compliance with requirements.
  - 1. Procedures: Perform each visual and mechanical inspection and electrical test stated in NETA ATS, Sections 7.5, 7.6, and 7.16. Certify compliance with test parameters.
  - 2. Remove and replace malfunctioning units with new units, and retest.

### 3.5 CLEANING

- A. Remove paint splatters and other spots, dirt, and debris. Touch up scratches and mars of finish to match original finish. Clean devices internally, using methods and materials recommended by manufacturer.

END OF SECTION 16481